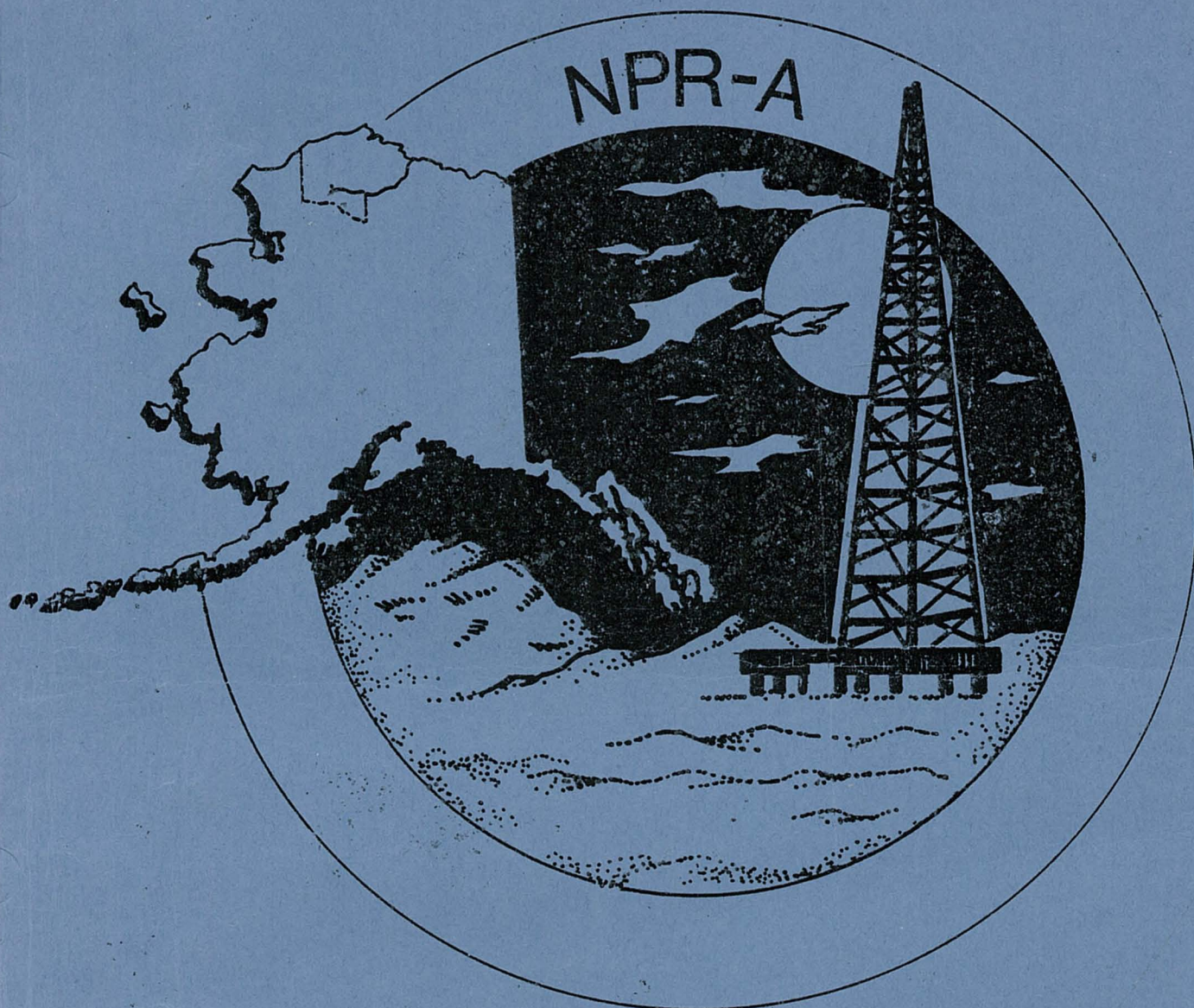




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THE NATIONAL PETROLEUM RESERVE  
IN ALASKA (NPR-A) LEASING PROGRAM:  
AN EVALUATION OF THE PROGRAM'S EFFECTS ON  
SUBSISTENCE USES OF THE RESERVE



October 1983



UNITED STATES DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

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## PREFACE

The attached evaluation was prepared to comply with Section 810 of the Alaska National Interest Lands Conservation Act of 1980 (ANILCA). Section 810 of ANILCA addresses in part, decisions to lease public lands within Alaska. Section 810 (a) mandates an evaluation of the leasing decision in terms of these three analytical factors:

- The effects of the leasing decision on subsistence uses and needs;
- The availability of other lands for the purposes sought to be achieved, and
- Other alternatives which reduce or eliminate the use, occupancy or disposition of public lands needed for subsistence purposes.

The attached evaluation discusses, and reaches conclusions relative to, each of these three analytical factors.

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EXECUTIVE SUMMARY  
AND AMENDMENT TO THE MAY 1, 1983 RECORD OF DECISION

Section 810(a) of the Alaska National Interest Lands Conservation Act (ANILCA) requires the head of the Federal agency having primary jurisdiction over lands to make certain evaluations relating to subsistence uses and needs in determining whether to withdraw, reserve, lease, or otherwise permit the use, occupancy, or disposition of public lands. Specifically the agency head\* shall evaluate the effect of such use on subsistence uses and needs, the availability of other lands for the purposes sought to be achieved, and alternatives which would reduce or eliminate the use, occupancy, or disposition of public lands needed for subsistence purposes.

If the agency head determines that the withdrawal, reservation, lease, permit, or other use, occupancy, or disposition of such public land would significantly restrict subsistence uses, he or she must additionally comply with certain notice and hearing requirements and make additional Section 810(a)(3) determinations (see page 3).

This document contains the Bureau of Land Management's ANILCA 810 evaluation for an oil and gas leasing program within the National Petroleum Reserve in Alaska. This evaluation is based on the following logic:

- If activities central to the subsistence lifestyle are precluded by oil field development (see Table Six for central subsistence activities): and,
- If the number of individuals whose activities are precluded represents, in the eyes of a reasonable observer, a major proportion of active subsistence harvesters (see page 6 for a discussion of the difference between individual and collective impacts):
- Then restrictions on subsistence would be significant.

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\*By a memorandum dated December 2, 1980, Cecil Andrus (then Secretary of Interior) delegated ANILCA duties to the respective land managing agencies within the Department of the Interior. Actions within the National Petroleum Reserve in Alaska were, subsequently, redelegated to the Alaska State Director, Bureau of Land Management

The attached evaluation discusses a zone within which are found lands intensively used for subsistence (pages 21 and 22). An illustrative oilfield is then analytically introduced into this zone. In view of the mitigations that would be applied to such a field, the evaluation authors found that subsistence resources could be preserved and access to subsistence harvesting sites could be assured (pages 22-27). The evaluation further discusses the amount of habitat within NPR-A that is likely to be affected by field development(s). The document forecasts that approximately 3/4 of one percent of NPR-A's lands and waters would lie within the perimeters of oilfields. About 4/10 of one percent of the Reserve is foreseen as subject to, or immediately adjacent to, facility placements (pages 7, 12(a) and Appendix One).

The document further explores the subsistence harvesting information that would be gained and mitigations that would be applied during 810 compliance at the permitting stage (pages 7, 14, 22-27 and Appendix Three). Based on the relatively small amount of NPR-A habitat that would be affected by development and on the other analytical consideration discussed above, the evaluation authors concluded that they could not forecast any reasonably foreseeable events that would entail a significant restriction of subsistence uses.

Based on this conclusion by the evaluation authors and based on the discussion of alternatives that could minimize subsistence impacts (page 26), and on the availability of other lands that might support the public purpose (oil and gas leasing was established as the public purpose in Public Law 96-514), the State Director has concluded:

- That the NPR-A leasing program would not significantly restrict subsistence uses of (within) the Reserve (this conclusion is discussed in detail relative to sites disturbed by facility placement at pages 23-25):
- That the NPR-A lands identified as being prospective oil and gas lands must be offered for leasing to accomplish the public purpose: and
- That a set of reasonable alternatives for minimizing impacts to subsistence were evaluated.

Taking these conclusions into account, I confirm the decisions contained in the May 5, 1983, "Record of Decision on Oil and Gas Leasing and Development in the National Petroleum Reserve in Alaska."



Curtis W. McVee

Alaska State Director



## I. Introduction

The Alaska National Interest Lands Conservation Act (ANILCA) provides at Section 810 (a) that:

When deciding whether to withdraw, reserve, lease, or otherwise permit the use, occupancy, or disposition of public lands..., the head of the Federal agency having primary jurisdiction over such lands or his designee shall evaluate the effect of such use, occupancy, or disposition on subsistence uses and needs, the availability of other lands for the purposes sought to be achieved, and other alternatives which would reduce or eliminate the use, occupancy or disposition of public lands needed for subsistence purposes. No such withdrawal, reservation, lease, permit, or other use, occupancy or disposition of such lands which would significantly restrict subsistence uses shall be effected until the head of such Federal agency has, consistent with Section 810(a)(3):

(1) given notice to the appropriate State agency and the appropriate local committees and regional councils established pursuant to section 805:

(2) given notice of, and held, a hearing in the vicinity of the area involved; and

(3) determined that (A) such a significant restriction of subsistence uses is necessary, consistent with sound management principles for the utilization of the public lands, (B) the proposed activity will involve the minimal amount of public lands necessary to accomplish the purposes of such use, occupancy, or other disposition, and (C) reasonable steps will be taken to minimize adverse impacts upon subsistence uses and resources resulting from such actions.

ANILCA further mandates that if the Federal action would significantly restrict subsistence uses and if an EIS was prepared on the Federal action then the Section 810 (a)(3) determinations must appear in that EIS.

*Significance  
Definit con*

## II. A Process for Identifying Possible Restrictions

The Department of Interior, in the National Petroleum Reserve Production Act of 1976, was instructed to complete a series of studies of the resources of the National Petroleum Reserve in Alaska (hereafter referred to as the 105 (c) studies). One of these studies, Native Livelihood and Dependence (U.S. Department of the Interior, 1979) contained indepth discussions of the intimate relationship between the Inupiat people and the wildlife of the Arctic. [Based on this relationship it is logical to suggest that any evaluation that analyzes whether a proposed Federal action would possibly restrict subsistence uses should proceed using the process shown in Table One.]

---

Table One  
Subsistence Impact Evaluation Process

1. Determine whether that Federal action would significantly reduce the availability of harvestable resources by either causing a decline in the populations of wildlife or fish harvested for subsistence or by altering the distribution of these harvestable resources such that these wildlife and fish, although not decreased in population, are beyond the range of subsistence harvesters; and,
  2. Determine whether the Federal action would significantly limit the access of subsistence harvesters to areas where harvesting historically has taken place.
-



The meaning of the term "significantly," as it appears in Table One, can be clarified by reference to its context in Public Law 96-514 and by reference to the critical thinking of contemporary social science.

Public Law 96-514 (The Department of Interior Appropriations Act of 1981) stated, in part:

- That the Department of Interior shall commence an expeditious program of oil and gas leasing within the National Petroleum Reserve in Alaska (NPR-A); and,
- That the Department must mitigate the reasonably foreseeable and significantly adverse effects of the leasing program.

The meaning of "significance" used in this evaluation is drawn from the thinking of C. Wright Mills (1975). Mills, a contemporary social philosopher and scientist, held that when a phenomenon reaches a given order of magnitude (threshold) it qualitatively changes from a "trouble" to an "issue."

Troubles occur within the character of the individual and within the range of his immediate relations with others; they have to do with his self and with those limited areas of social life of which he is directly and personally aware. Accordingly, the statement and the resolution of troubles properly lie within the individual as a biographical entity and within the scope of his immediate milieux--the social setting that is directly open to his personal experience and to some extent his willful activity.

Issues have to do with matters that transcend (the) local environments of the individual and the range of his inner life. They have to do with...the institutions of an historical society as a whole, with the ways in which various milieux overlap and interpenetrate to form the larger structure of social and historical life. An issue is a public matter....

Using the Mills' paradigm, restrictions on subsistence use would not be significant (would be minor) and would lie in the realm of troubles if:

- There would be no (or a slight) reduction in the abundance of harvestable resources and no (or occasional) redistribution of these resources:
- There would be no effect (or slight inconvenience) on the ability of harvesters to reach and use active subsistence harvesting sites: and
- There would be no substantial increase in competition for harvestable resources (that is, no substantial increase in hunting by oilfield workers or outsiders using roads to the oilfields).

*Significance  
Definition*

Conversely, restrictions on subsistence use would be significant if there were large reductions in the abundance of harvestable resources, major redistributions of those resources, substantial interference with harvester access to active subsistence sites or a major increase in non-Native hunting.

*Insert 2*

### III. FEIS Findings on Possible Restrictions

Consistent with the discussion presented above and based on the stipulations adopted by the State Director as part of the preferred leasing alternative, the analysis which follows generally shows how the FEIS dealt with these questions:

- Would the preferred leasing strategy cause a reduction in the population of wildlife, fish, and other resources upon which subsistence harvesting depends: and/or would the preferred leasing strategy cause a redistribution in those harvestable resources: and/or,

*reduce pop.*

- Would the preferred leasing strategy cause a restriction on access to these harvestable resources?

*Access*

- Would the preferred leasing strategy lead to increased competition for the big game of the Arctic?

*Competition*

A. The discussion in this section presents a synopsis of the FEIS preferred alternative and overview of the FEIS evaluation of the effect of the preferred leasing strategy on the populations of wildlife and fish that provide the basis for subsistence harvesting and/or on the possible redistribution of these harvestable resources.

1. The Preferred Leasing Strategy

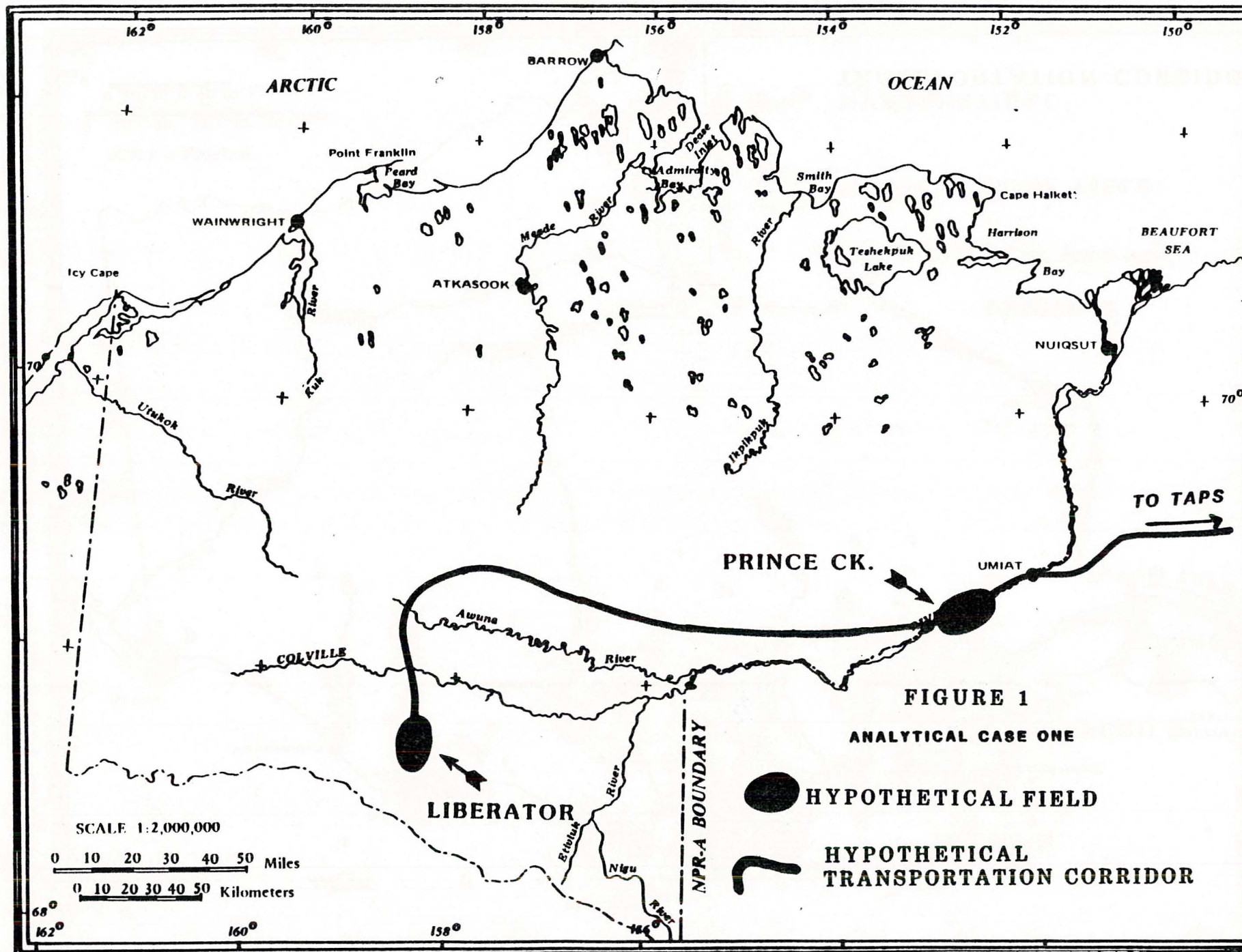
The preferred leasing strategy (see pages 128 - 134 of the FEIS) includes a five-year program of leasing with approximately two million acres offered each July from 1983 through 1987. Lands and waters that, based on historic evidence of use, are essential to calving of western Arctic caribou (highest density calving lands) and/or to molting of black brant (highest density molting lakes) were deleted from these sales. Stipulations to protect harvestable resources, subsistence streams and areas that have historically been used for subsistence were adopted as part of this program. Principal stipulations adopted include (see Exhibit One for other stipulations):

Subsistence Lifestyle

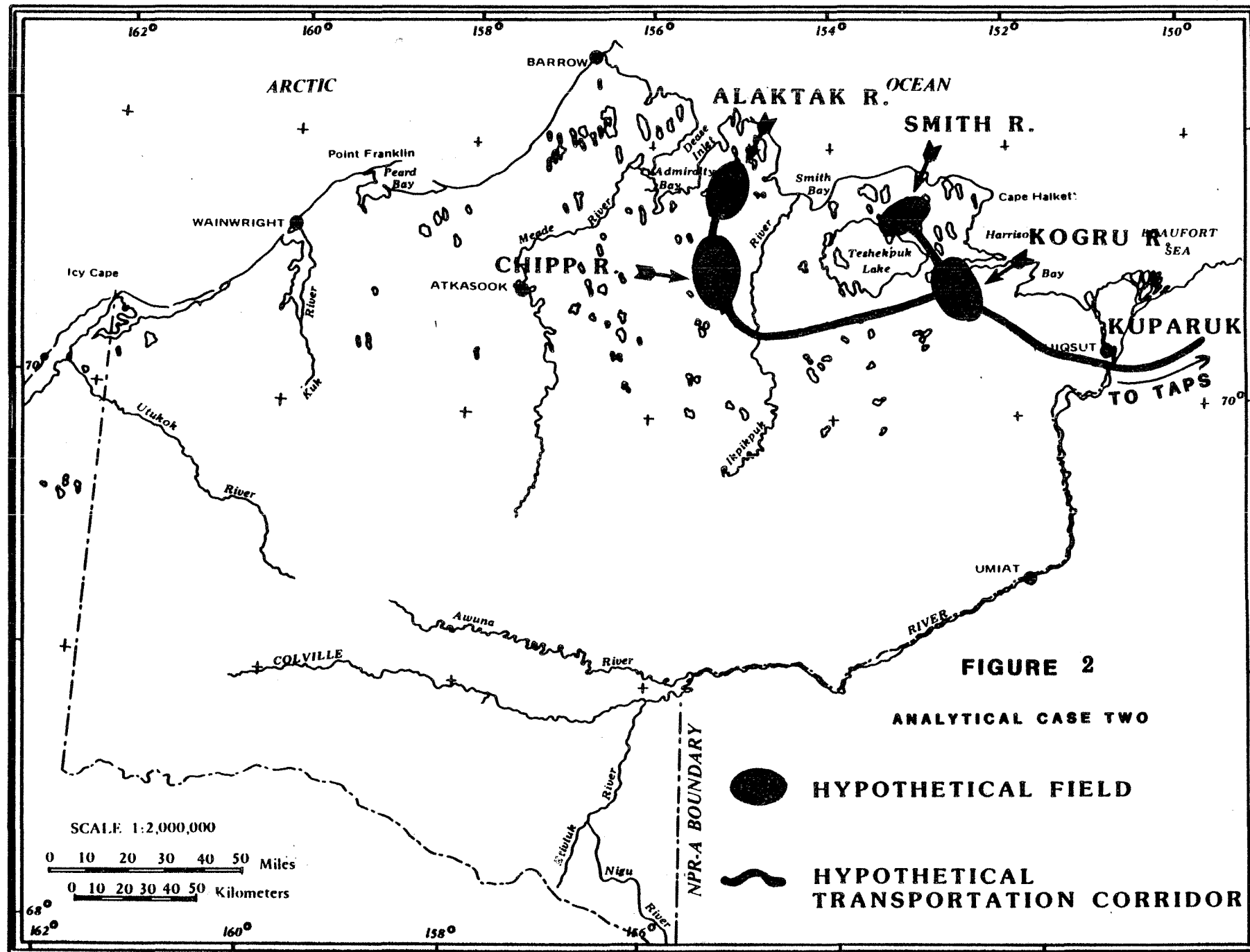
Areas within this lease contain harvestable resources utilized by North Slope residents as part of their subsistence lifestyle. If subsistence impacts are determined to be potentially significant by the Authorized Officer (AO), the lessee, prior to any drilling, construction or placement of any exploration/development structures on lease areas, including pipeline and facility placement (hereafter referred to as "operation"), shall gather site-specific information using field examination techniques approved by the AO. On all areas where operations will take place, the field examination(s) shall identify the following:

- a. active subsistence hunting, fishing, trapping or gathering sites;
- b. relocating the site of such operations and the design of production, processing and transportation facilities to assure continued access of the subsistence user to the subsistence sites and to areas where the harvestable resources are of known high density; and/or
- c. establish that such operations will not have a significant adverse effect upon the harvestable resources, the subsistence sites, and/or the subsistence users' access to the sites or resources after consultation with those rural Alaskans who actively use the area for subsistence.





Source: Shepard, et al., 1982



Source: Shepard, et al., 1982

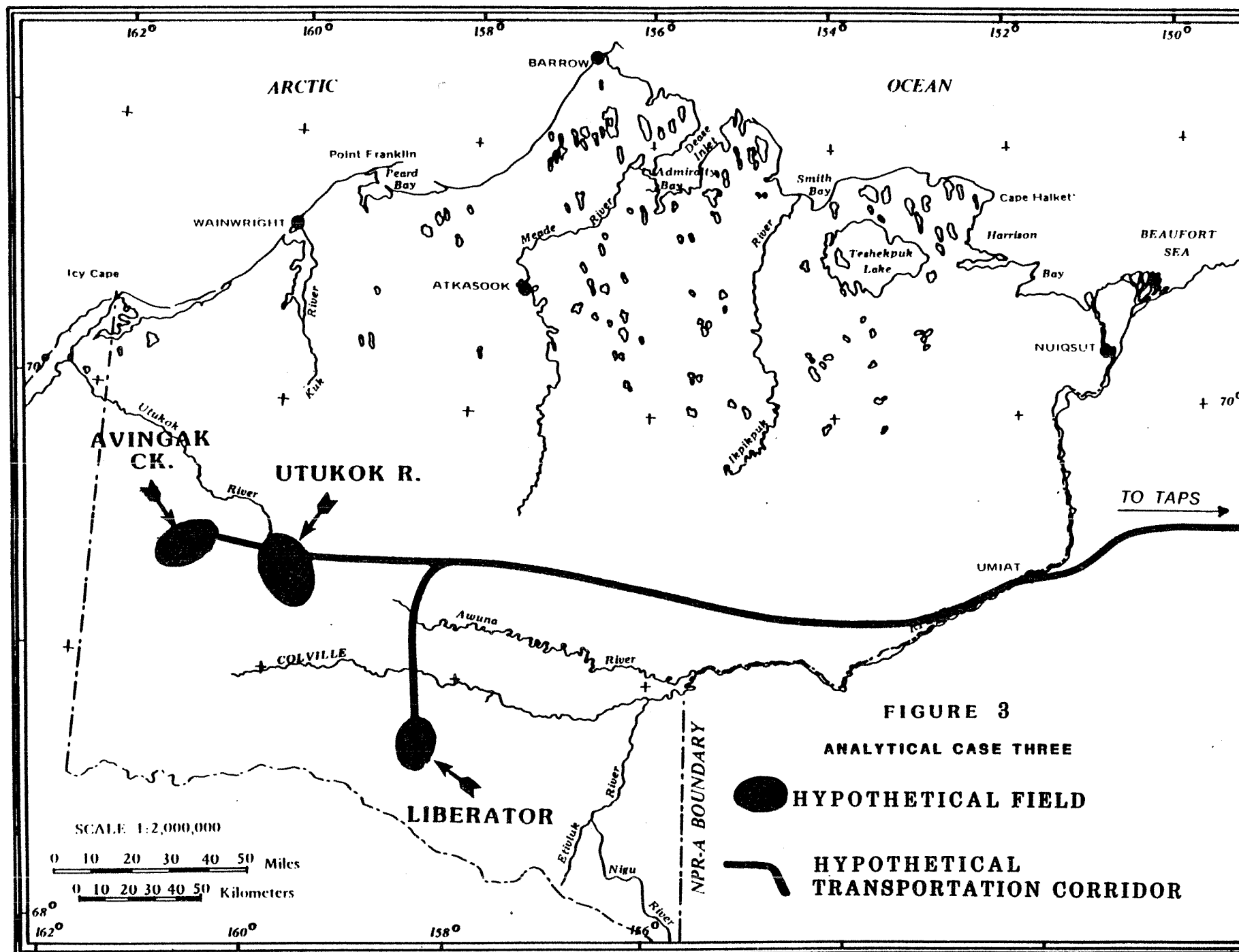


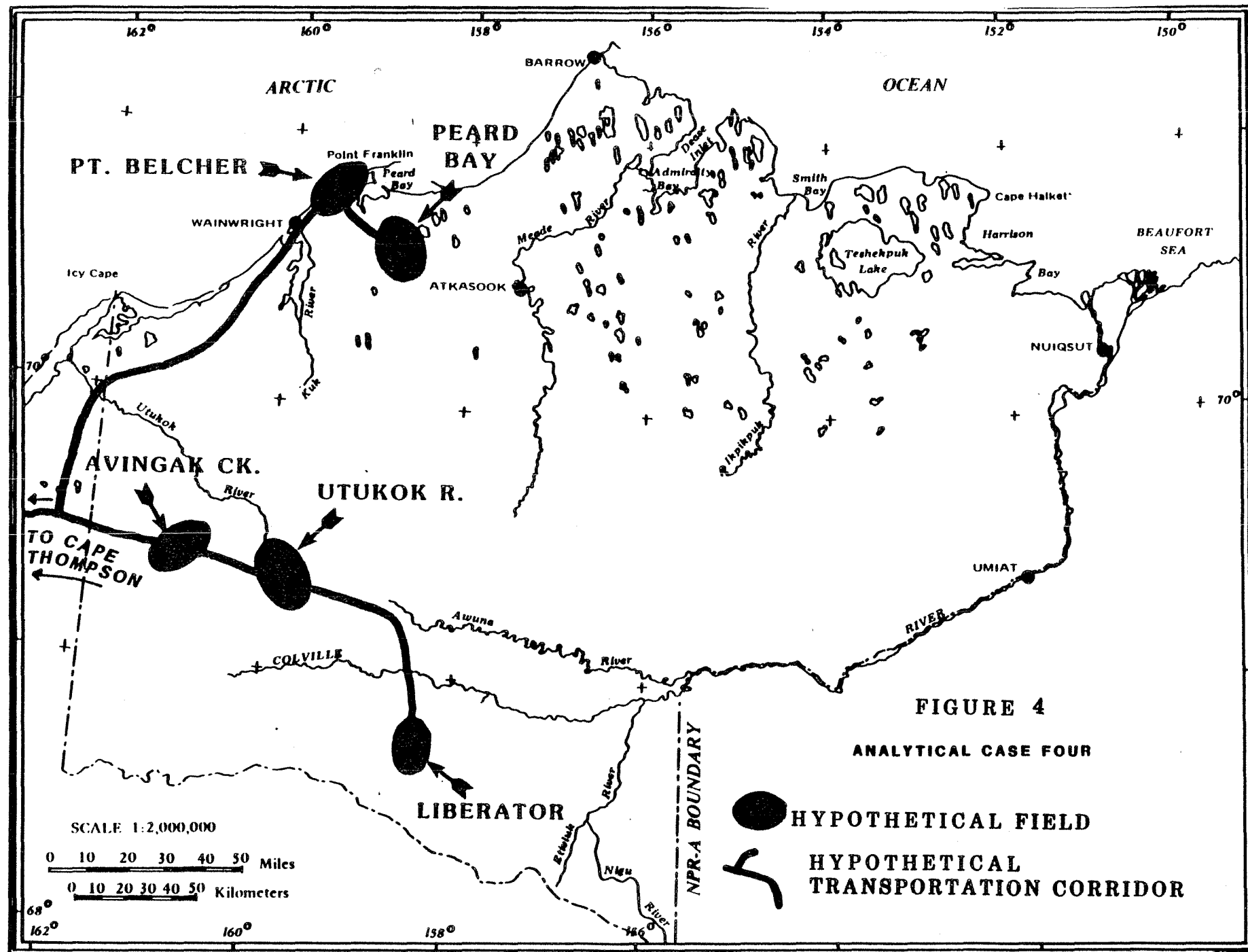


FIGURE 3

ANALYTICAL CASE THREE

 **HYPOTHETICAL FIELD**  
 **HYPOTHETICAL TRANSPORTATION CORRIDOR**





Source: Shepard, et al., 1982

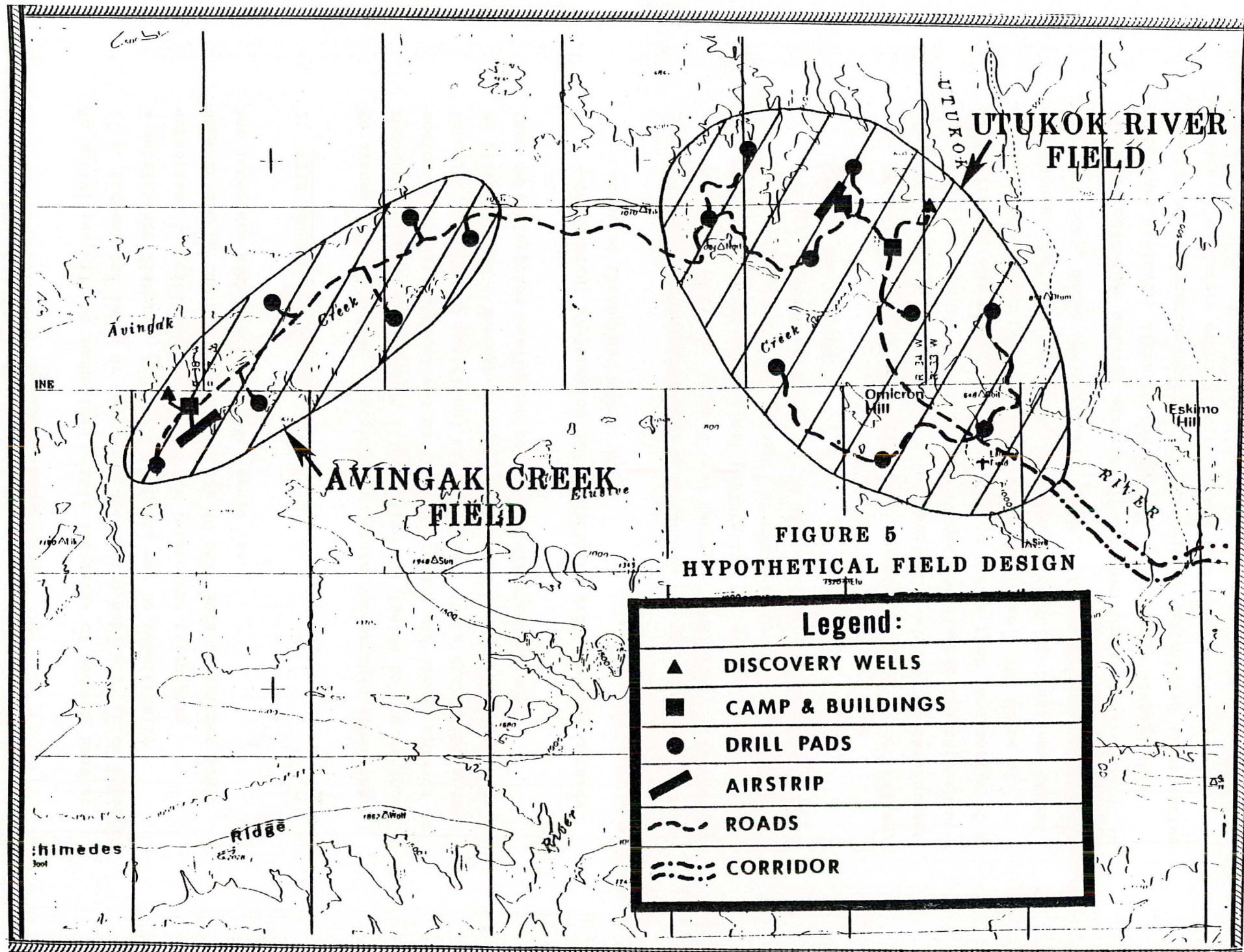


FIGURE 5  
HYPOTHETICAL FIELD DESIGN

### Subsistence Fisheries

No activities will be authorized within 300 yards of aquatic habitat (i.e. streams and lakes or estuarine and marine habitats) which support a subsistence fishery. Limited exceptions may be specifically authorized in writing by the AO if the lessee can reasonably demonstrate to the satisfaction of the AO that such activities would not interfere with continued subsistence use.

### 2. FEIS Assessment Process

To assess the effects of development on these harvestable subsistence resources, the FEIS allocated illustrative oil fields to the various ecological zones (coastal and marine: wet tundra and lakes: uplands and interior rivers: and mountains) within NPR-A. These fields are shown as illustrations 1 through 5. The FEIS focused on the fields rather than on exploration leading up to field development because:

- Geophysical exploration and exploratory drilling have already occurred throughout NPR-A: and,
- The Arctic biologists who took part in the waterbird and caribou workshops (Gilliam, James K. and Peter C. Lent, 1982) assessed the effects of prior geophysical exploration and exploratory drilling and concluded that "the impacts of exploratory activities can be avoided, reduced or mitigated if stipulations (recommended by the panels) are applied."

Thus if there are to be any significant impacts from the NPR-A leasing, these adverse effects would occur in association with field development and operation. These fields were developed and distributed throughout the differing environments of the NPR-A to assure that the impacts of a development in each type of habitat were described. The State of Alaska has a habitat classification approach dividing lands and waters into critical, prime and important "types." A development in critical habitat could have greater adverse effects than the same development in important habitat. Although the BLM has not formally adopted this habitat classification system, the EIS writers distributed illustrative fields to each type of habitat to assure that adverse effects were adequately examined. The EIS writers considered (a) the possible adverse effects that could result from development of these fields (see Table Two), (b) the amount of lands and waters disturbed by each combination of fields and the pipelines and roads associated with those fields, (c) the type(s) of habitat that would be affected by the fields, roads and pipelines and then (d) developed conclusions as to whether a development or activity within the affected habitat(s) would lead to a loss of wildlife population.



---

Table Two  
(Adapted from State of Alaska, 1982)

General Causes of Adverse Effects

1. The loss or alteration of habitat leads to reduced carrying capacity for wildlife:
  2. Increased stresses associated with avoidance of human activity leads to the death of individual animals during times when their energy reserves are at the low ebb within their annual life cycle:
  3. Chemicals introduced into the environment interfere with the organisms life processes resulting in death through asphyxiation and/or poisoning: and
  4. Increased hunting pressure from improved road access and/or elimination of individual animals that pose safety problems in developed areas leads to direct mortality of individual animals.
-

When assessing the likelihood that Table Two impacts to wildlife would occur under the preferred alternative, the EIS writers considered not only the amount of habitat that the various combination of fields, roads and pipelines would alter (Appendix One and pages 12-12a), but also the fact that the preferred alternative (a) had controls on oil worker sport hunting written into stipulations, (b) had deleted the highest density waterfowl molting and caribou calving habitat, and (c) had applied special management zone protection to critical and prime habitats. Under the SMZ approach, the BLM reserves the right to require the relocation of facilities to areas outside of critical or prime habitat(s), to require seasonal wind-downs of human activities to reduce disturbance to wildlife, to require maximum feasible consolidation of facilities to minimize the loss of habitat, and to require use of innovative designs that minimize the amount of disturbance wildlife experience. (For a discussion of alternatives for reducing the barrier effect of pipelines, the reader is invited to review a recent report (1982) titled "Caribou Responses to the Pipeline/Road Complex in the Kuparuk Oil Field" prepared by Alaska Biological Research.) The EIS, based on the above considerations, reached a number of key conclusions. They are:

- The Caribou Discussion Group (CDG) at the Caribou/Waterbird Workshop (Gilliam and Lent, 1982), did analyze the effects of various leasing alternatives:
- The CDG did not forecast demographic changes, such as a percent decline of (any) herd\*:
- The CDG stated that exploration would be unlikely to have significant impacts in the future...: and,
- The CDG found that the risk of significant adverse effects can be substantially reduced by adopting appropriate corridor design features, requiring convoying...and careful regulation of aircraft operations (The SMZ stipulation, adopted as part of the preference alternative, reserves to BLM the right to require these mitigations.).

---

\* Subsequent to the convening of the panel, more data on the reaction of the Central Arctic Herd to development of the Prudhoe Bay and Kuparuk oilfields have become available (see Appendix Four). These data suggest that, notwithstanding the acknowledged avoidance reactions and other adverse behavioral effects, there is no evidence that oil developments lead to any significant population effect on Arctic Caribou.

The Panel's recommendations were substantially adopted within the FEIS preferred alternative. Given the deletion, as recommended by the panel, of the core calving habitat, and given the panel's conclusion regarding effective mitigations that would reduce the barrier effect of fields and pipelines the FEIS concluded that no major reduction in caribou numbers and no major redistribution of caribou calving would be expected. The FEIS noted that this conclusion was necessary for the impact analysis to be consistent with the most recent literature (Banfield, Jakimchuk and Cameron, 1981; Gilliam and Lent, 1982; Truett, Howard and Johnson, 1982) which "has been unable to identify or predict specific changes in population levels despite reported observations of changes in caribou behavior when confronted by industrial activities" (page 85).

The FEIS writers analyzed other harvestable resources of value to the subsistence lifestyle and, in view of the minor amount of habitat(s) altered (see Appendix Two) and in view of the mitigations adopted as part of the preferred alternative, concluded that no significant impacts to geese, fisheries, moose, Dall sheep, foxes, wolverine and other notable resources were foreseen (pages 76-78, 108-115, and 135).



The BLM recognizes that not all Arctic ecologists or biologists agree with the conclusions set out above (finding of no significant impact to harvestable resources).

For example, although both the BLM and ADF&G personnel familiar with the NPR-A agree that there is critical caribou calving habitat within the Reserve and although the BLM agrees with ADF&G that the five-year NPR-A leasing program does offer a portion of that critical caribou habitat for leasing, the BLM and ADF&G have reached fundamentally different conclusions about the likelihood and magnitude of adverse effects on caribou from future Arctic leasing.

A key factor in the ADF&G view is the conclusion by Dr. Cameron (1982), in his Issue Paper, which stated in part:

- That as much as 12.5 million hectares of the North Slope could be adversely affected by development; and,
- That a loss of 12.5 million hectares of caribou habitat would constitute a significantly adverse impact on caribou.

Dr. Cameron's conclusions that caribou would experience major harm from the alteration of 12.5 million hectares of habitat are justified. If the BLM had concluded that 12.5 million hectares of caribou habitat would be altered on the North Slope then the Bureau would concur that major adverse effects on caribou would result.

The BLM analysis indicates that less than 500,000 hectares of habitat will be subject to future alteration on the North Slope as a result of oil and gas discoveries and development. This conclusion is based on the following considerations:

- The U. S. Geological Survey (1982) foresees 6 billion barrels being discovered on the North Slope,
- The FEIS foresaw 1.46 billion barrels being produced from NPR-A,

- The typical productivity of Alaska oil traps is 13,100\* barrels per hectare (Prudhoe Bay excluded from the data set to maximize the amount of lands needed to produce a given amount of oil):  
and,
- At 13,100 barrels per hectare approximately 460,000 hectares would be within the perimeters of "new" Arctic oilfields (6,000,000,000/13,800). Approximately 70,000 hectares\*\* of this would be within NPR-A (Appendix One). Thus, about 3/4 of one percent of the 9.3 million hectare Reserve would lie within the perimeter of oilfields.
- That only about 1-2 percent of the lands within the perimeter of Arctic fields would be subject to (physically disturbing) facility placement (wells, roads, airfields, etc.). This point is well illustrated in a map of the Kuparuk and Prudhoe Bay fields (attached as Exhibit Two) and discussed at page 15 below.

---

\*The seven producing Alaska fields, exclusive of Prudhoe Bay, will have produced (have recoverable reserves of) 1,578,000,000 barrels over their collective lives (State of Alaska, 1983). There are 298,364 acres (or about 120,500 hectares) within the perimeters of these seven fields for a ratio of 5,289 barrels per acre (or about 13,100 barrels per hectare).

\*\*The 70,000 hectares of lands within NPR-A foreseen as within future undiscovered) oilfields would constitute about 3/4 of one percent of the 9.3 million hectare reserve.

## B. The FEIS Wildlife Impact Findings in the Context of the Third Sale

A hypothetical field was developed near Barrow to aid in transferring the general conclusions of the EIS to the lands offered in the third sale. This "third-sale context" analysis is discussed below:

### 1. Analysis of a Field on Third Sale Lands

The hypothetical field near Barrow was developed using BLM minerals and environmental protection specialists. The minerals personnel identified a potential field of approximately 100,000 acres using the best available geophysical data available to BLM. A map illustrating the size and physical arrangement of this field is available from the Fairbanks District Office, Arctic Resource Area. The same minerals people then provided an illustrative development plan that the environmental protection specialists modified to mitigate socio-cultural and environmental impacts. Mitigation cannot become specific until the data on potential impacts and development activities becomes specific. The development portrayed is not specific. The environmental data gathering required of industry, to provide design solution development of a production plan, cannot be integrated into such an illustration. This illustration does not take into consideration the pipeline or storage facilities necessary to deliver this oil to market. Although these pipelines could have significant environmental impact, recent research (Alaska Biological Research, 1982) suggests that these impacts can be largely eliminated (reduced below statistical significance). The illustration focuses on a "prototypical" development on and near Third Sale Lease tracts (i.e. Tracts 1 and 6). The BLM determined that these tracts have high subsistence value and subsistence stipulations were attached to these lands.

This analysis was done for illustrative purposes. Any development will require its own NEPA document addressing the specific development plan. This field development NEPA document would assess regional transport of the oil and gas and cumulative regional impacts. As would be the case in such a "real field" NEPA analysis lease stipulations have been designed for the hypothetical field to protect cultural, wildlife, and subsistence resources. These stipulations would not only affect field development but would also control the exploration phase preceeding development. For example, tracts that contain potentially high subsistence values have lease stipulations requiring industry to gather sufficient information on subsistence values to mitigate exploration impacts. The stipulations placed on lease tracts direct industry to design solutions to mitigate both exploration and development impacts.

Table Three shows the stipulations assigned to Third Lease Sale Tracts 1, 2 and 6 (the tracts developed as part of the hypothetical field).



Table Three

Assignment of Lease Stipulations

Stipulations	<u>Tracts</u>		
	1	2	6
Subsistence Lifestyle	x		x
Subsistence Fisheries	x		
Habitat	x	x	x
Cultural	x	x	x

These stipulations would, in the hypothetical field, be triggered on Tracts 1 and 6. The reservoir underlying the hypothetical field terminates in Tract 2 with no actual well or road development within Tract 2. The "map" of the hypothetical reservoir shows about half of Tracts 1 and 6 underlain by a possible oil "trapping" structure. Tracts 1 and 6 were each given three multiple well development pads and part of one central processing facility complete with airstrip, roads, and pipelines. The feeder pipelines to the central processing facilities are adjacent to the roads as shown. Alternatives for separating roads and pipelines are available to help mitigate caribou crossing impacts. (See "Caribou Responses to the Pipeline Road Complex in the Kuparuk Oil Field" by Curatolo, James A., Stephen M. Murphy, and Martha A. Robus; Alaska Biological Research, 1982). One material source (sand) was also placed in Tract 1.

Table Four summarizes the regional surface disturbance estimated for production from this hypothetical field.

Table Four

Disturbance Effect of Field Facilities

Facility	No.	Disturbed Acres
Primary Road (30' crown)	36 Mi.	215
Spur Roads (24' crown)	24 Mi.	116
Multiple Well Pads	19 Ea.	272
Storage Pads (1 at Barge Landing Site)	3 Ea.	45
Central Processing Facilities, Pad	2 Ea.	186
Airstrip	1 Ea.	30
Material Sources (1 Ea. Coastal Gravel, 3 Ea. Inland Sand)	4 Ea.	400
Total Disturbed Acres		<u>1,264</u>

The 1,264 acres of disturbed lands shown in Table Four suggest that approximately 1-2% of the 100,000 acre field would be physically altered. The facilities were sited to reduce or eliminate adverse effects on, and occupancy of, presently known areas of high resource value throughout the entire region rather than for Tracts 1, 2 and 6 alone.

2. Analysis of the Effect of the Hypothetical Field on Harvestable Resources (Appendix Two contains a more detailed discussion of this field)

The analysis of the hypothetical field near Barrow included a review of the types of stipulations that would apply to such a field. These stipulations include:

1. Limitations on hunting or movement of oilfield workers off facility pads, roads, etc.
2. Requiring that the field be designed to avoid no sensitive areas (these no surface occupancy (NSO) limitations would protect critical habitat and fragile features): and,
3. Aircraft restrictions to avoid disturbances during the nesting and molting season.

These and many more stipulations identified in the field development NEPA document would mitigate oil and gas impacts on the waterbird populations within the area.

This hypothetical field south of Barrow is used by portions of the Western Arctic and Teshekpuk Caribou Herds as a wintering area. A developed field with roads, drill pads, pipelines, airstrips and material sites would have some negative impacts on the caribou migrating through or wintering within the area. However, stipulations can be developed to mitigate the negative impacts of oil and gas development.

Caribou specific stipulations, would likely require that:

- Pipelines be elevated so that a greater clearance would provide unimpeded surface snow movement to eliminate drifting snow;
- Short sections of pipelines be buried (ramped) to help caribou movement through the area:
- Roads be at least 1/2 mile from the pipeline with pipelines designed to take advantage of topographic features to enhance winter crossing success by caribou; and
- Vehicle traffic on roads be controlled (i.e. convoy, days when roads would be closed, etc.) to help enhance winter crossing of the area.

These permit stipulations would help mitigate any impacts of oil and gas on the wildlife resources of the area as would the wildlife conservation stipulation (Exhibit One) and the subsistence stipulation listed at page 7 above.

### 3. Conclusions Regarding Impacts to Harvestable Resources

Before a major project such as developing an oil and gas field, the BLM through a field development NEPA document, would develop stipulations and mitigating measures to conserve the wildlife resources of the area. Given these mitigations, the BLM has concluded that, while developing any major oil field within the Barrow area would have some negative impacts on the wildlife resources, there will not be any significant impacts to overall wildlife resources within this area.

C. Quantitative analysis of the likelihood of major restrictions on harvester access.

Exhibit One contains a FEIS "preferred alternative" stipulation that assures the rural residents of the North Slope a right to continue their historic use of any lands leased (see Column Three of Exhibit One, Environmental Training Stipulation).

The rural residents of the North Slope shall have the right of ingress and egress and the right to use the leasehold in conducting their hunting, trapping and related activities....

Notwithstanding this right of access, the structures within an oilfield may impede harvester movement. There is, therefore, a need to describe the likely effects of a field developed on lands within NPR-A that support a high density of subsistence harvesting sites. A first step in discussing these likely effects is to identify lands that support intensive subsistence use (pages 18-21). The likelihood that these lands would experience development is outlined in Appendix Six.



1. Identification of Lands Intensively Used for Subsistence.

If a field (or several fields) were within an area that historically had supported harvesting of caribou, moose, sheep or bear and if that field affected the ability of Native harvesters to hunt, fish and gather resources, then there would obviously be a restriction on subsistence use.

If the word use, in the phrase subsistence uses, is roughly equivalent to the term activity then one can rate (compare) big game hunting with other harvesting activities. This rating of activities is accomplished by analyzing the proportion of adult Inupiat who historically have taken part in the various activities (see Table Five).

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Table Five

Rating the Importance of Big Game Hunting

(Source: Adapted from the University of Alaska, 1981)

<u>Harvesting Activity</u>	<u>Rating</u>
Caribou hunting	1 (48%)*
Fishing	2 (37%, tie)
Helping whaling crew	2 (37%, tie)
Spring whaling crew	3 (34%)
Hunting waterfowl, gathering eggs	4 (33%)
Hunting seals	5 (29%)
Hunting walruses	6 (18%)**
Hunting moose or sheep	7 (17%)
Fall whaling crew	8 (6%)

\*Numbers in parentheses are percentages of adults that historically took part in the activity.

\*\*A number of activities that involve the finishing of subsistence goods (sewing of parkas, etc.) were deleted from the table to focus on harvesting activities.

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Table Five clearly suggests that caribou hunting, fishing and whaling are the premier subsistence uses.

Given the above identification of central subsistence activities, it is appropriate to identify lands where those activities are intensively practiced. Available data sources indicate that the vast majority (over 90 percent) of subsistence use sites (TLUI's and allotments) are located within 30 miles of the coast and/or within 50 miles of the villages (Department of Interior, 1979. Maps showing the distribution of Traditional Land Use Inventory Sites and Native Allotments. See also page 25 for information on BLM's ongoing survey work.). This is consistent with the literature that describes the Inupiat as formally Central-Based wanderers and currently a semi-permanent sedentary people (Oswalt, Wendell H. 1967). Central-Based wandering, according to Oswalt, applies directly to the Natives of the North Slope who were historically:

A community that spends part of each year wandering and the rest at a settlement or "central base,....

and who have more recently been a Semi-Permanent Sedentary people who:

can be identified with a village, that establishes itself in successive locations, occupying each for a number of years.

This movement of villages to adjust to shifts in resources on harvesting technologies have been described by Michael Jacobson and Cynthia Wentworth (1982). They analyzed one village in great detail (Kaktovik) and used that village's history to illuminate the adaptive nature\* of the Inupiat people.

Throughout time, Inupiat settlements, whether seasonal or permanent, have been situated to take best advantage of food resources. Only a few, such as Kaktovik, have become the permanent villages of today. Many other locations were inhabited in the recent past; up until the 1950's. Thus strong associations remain with these traditional sites, and former residents of these places now living in Kaktovik like to return to them seasonally to fish and hunt. Several people were born at these sites, and some have close relatives whose graves are located at these historic places.

The discussion above suggests that development of a field on lands that are near to the coast or within 50 miles of a village should be carefully analyzed for possible (or perceived) restrictions on subsistence activities. Analysis of such an illustrative field is presented below.

The existence of this zone of intensively used subsistence lands is reinforced by comments made by the Honorable Eugene V. Brower, Mayor, North Slope Borough (1982). The Mayor identified lands south of Barrow to and including lands within 30 miles of Atqasuk, lands within 30 miles of Nuiqsut and lands within the Kuk River drainage (Wainwright subsistence lands) as being extensively used for caribou hunting, waterfowl hunting and fur trapping.



3. Detailed Analysis of a Development in an Area of High Subsistence Site Density (The reader is invited to review Appendix Three for a more complete analysis of this field.)

As discussed at page 13, a field was sited near Barrow to aid in determining the applicability of the FEIS subsistence findings to the third sale area. Native allotments and TLUI's within the area of this hypothetical field were identified. From this material it is possible to make limited statements about impacts to these specific sites and their usages for purposes of the leasing 810 evaluation. The reader is invited to review Appendix Three for a discussion of 810 compliance efforts during the permitting process. It is, however, critical in reading those statements to recognize that at least two more stages of 810 compliance would have taken place before any facilities in the hypothetical field could have been permitted by BLM. Furthermore, before construction of the field would be permitted, a "field development" NEPA document would have been done. This NEPA document would have gathered both area-wide and site-specific data on subsistence uses involving the affected tracts. Further, additional site-specific analysis of impacts to subsistence uses would have taken place before the permitting of individual placements of development-related facilities. Thus, to lay out the hypothetical development example implies that very detailed site-specific analysis of subsistence uses has already happened--and that mitigation has already occurred.

On page 13 a discussion appeared regarding the existence of a map showing the location and facility placement for the hypothetical field. To document the possible impacts to site-specific subsistence use sites within this field, the 19 TLUI sites and Native Allotments shown as within the hypothetical example development south of Barrow were analyzed as to the type of use taking place on these sites. The significance of these sites and a description of uses occurs on those sites as copied off the North Slope Borough Traditional Land Use Inventory for the Barrow-Atkasook area (Nov. 1977 edition) is presented on the pages that follow. These pages present a summary of: 1) the respective significance of each site; 2) possible impacts such sites might receive for their subsistence uses from the hypothetical example development; and 3) possible mitigation to lessen or eliminate such impacts.

<u>Type of Use:</u>	<u>Site # from TLUI:</u>	<u>Possible Impacts &amp; Mitigation:</u>
1 = Cabins/Shelter Cabins Today	#35	Disturbance and unauthorized use could be mitigated by siting development away from the cabins and stipulating no disturbance
2 = Graves/Cemetery	None reported	----(Note: if unreported graves were found during required archeological surveys, mitigation by avoidance might be stipulated)
3 = Ruins/Sod House/ Bones	#13, 14, 18, 19, 35, 36	Disturbance and/or unauthorized use could be mitigated by siting developments away from such areas which might receive additional protection from Federal laws addressing archeological sites
4 = Fishing Area	#26B, 28, 29, 34, 35, 36, 76, 134	Destruction of fish and fish habitat would be mitigated by stipulations and laws governing setbacks of facilities from streams and discharges into water bodies, plus tight regulation of gravel and water extraction (if allowed at all)
5 = Trapping Area	#14, 19, 26B, 28, 29 34, 35, 36, 112, 113, 114, 131, 134	Wildlife and/or trapline disruption could be mitigated by siting development facilities away from specific trapping area and trap line identified in a subsistence study
6 = Hunting/Camping Area	#13, 14, 15, 16, 17, 18 19, 26B, 28, 29, 34, 35, 36, 76, 112, 113, 114, 131, 134	<u>Hunting:</u> see Appendix Four for a discussion of possible impacts to wildlife (including caribou and waterbirds) and possible mitigations. <u>Camping:</u> destruction or disturbance of important camping area could be mitigated by siting development away from such areas and stipulating no disturbance

<u>Type of Use:</u>	<u>Site # from TLUI:</u>	<u>Possible Impacts &amp; Mitigation:</u>
7 = Cellars	#14, 18, 28, 29, 34, 35	Disturbance, destruction, or unauthorized use could be mitigated by siting developments away from such areas which might receive additional protection from Federal laws addressing archeological sites
8 = Other (nesting, seals, roots)	#14, 17, 19, 26B, 76	<p><u>Nesting:</u> see Appendix Four.</p> <p><u>Seals:</u> destruction or disturbance of important sealing camps could be mitigated by siting development away from such areas and stipulating no disturbance: under the Marine Mammal Protection Act, non-Natives are barred from harvesting seals, thus no additional harvest pressures should occur</p> <p><u>Roots:</u> destruction or disturbance of important sites for collecting roots, <u>berries</u>, or other plants could be mitigated by siting development away from such areas and stipulating no disturbance</p>
9 = Whaling Settlements, Area	#14	Disturbance, destruction, or unauthorized use could be mitigated by siting developments away from such areas
10 = Important Events, Old Site	#14, 18, 35, 36	Disturbance and/or unauthorized use could be mitigated by siting developments away from such areas which might receive additional protection from Federal laws addressing archeological sites
11 = Reindeer Herding Sites	#19, 35	Disturbance, destruction, or unauthorized use could be mitigated by siting developments away from such areas

Data on the location and "type of use" of the Native allotments are primarily drawn from BLM field examinations conducted principally in 1982 and 1983. Each allotment will be surveyed at a future date and minor adjustments could be made to boundaries at that time. Once surveys are complete, title to the surface estate will pass to individual Natives. Protection of any subsistence values would then be subject to negotiations between the Native surface owner, the Bureau of Indian Affairs (as advisor to the Native surface owner) and the lessee or permittee. Native surface owners might elect to negotiate occupancy fees, to restrict occupancy and/or to require rehabilitation of disturbed areas before granting permission to site certain development-related facilities or structures (e.g. wells, pipelines, roads, etc.) on particular allotments. Without such permission, the BLM will not issue any permit(s) leading to surface disturbance by oil development.

Finally, it is important to note that BLM's ability to mitigate subsistence impacts is further strengthened by Section 811 of ANILCA, which states; in part:

The Secretary shall ensure that rural residents engaged in subsistence uses shall have reasonable access to subsistence resources on the public lands.

Based on BLM's ability to require site-specific subsistence use data before any ground-disturbing activity can occur, all important harvesting and gathering sites could be identified before any disturbance was permitted. As discussed above, BLM's mitigation strategies would allow disturbance of berry patches, herb gathering areas, hunting and fishing camps and other subsistence sites only as a last resort (If, and only if, the facility could not be sited elsewhere.). Given the small amount of land affected (see page 15), those uncommon cases where a subsistence site is disturbed would not be significant (see page 5 for a discussion of the meaning of significant). Thus, there would be no significant restriction to harvester access as a result of the oil and gas leasing program. This conclusion includes all areas within the 3rd NPR-A Lease Sale held on July 20, 1983, plus all other areas identified in the Record of Decision as appropriate to lease for later NPR-A oil and gas lease sales.

Furthermore, the analysis of the hypothetical oil development area south of Barrow shows that no significant restriction to subsistence uses would occur because the BLM has reserved the right to relocate oilfield facilities and otherwise regulate development activities to avoid important subsistence use sites and to preserve the habitats and populations of harvestable biological resources.



#### D. Competition for Big Game.

This concern is explored in Appendix Five. That Appendix forecasts an increased harvest of 200 caribou per year because of an influx of "outsider" hunters who take advantage of improved Arctic access (NPR-A oilfield roads). This does not constitute significant competition when one realizes that 200 caribou are 7/100 of one percent of the current population of Arctic caribou.

#### V. Availability of Other Lands.

The Congress in Public Law 96-514 (December 1980) mandated "an expeditious program of oil and gas leasing" within the NPR-A. To accomplish this public purpose the BLM must make the NPR-A lands with the best oil and gas potential available for leasing. Leasing lands outside of NPR-A would be an alternative to offering lands within the Reserve but this alternative does not fall within the mandate.

"Best-prospective-oil-and-gas-lands" within NPR-A were either offered at the first two sales (January and May 1982) or are within or adjacent to the 500 EIS discussion tracts shown at Page 47 of the FEIS. (See Appendix Six for further information on the need to make best-prospective acreages available for leasing.)

#### VI. Alternatives Considered.

The FEIS had a "base case" leasing alternative (alternative A) that would have given site specific protections to subsistence uses. (See the subsistence fishery and subsistence lifestyle stipulations at FEIS page 81.) These mitigations apply a set back zone along subsistence fisheries and reserve to BLM the right to cause facilities and activities to be consolidated and/or relocated in areas where subsistence harvesting takes place. This "base case" alternative was a lesser included part of the other FEIS alternatives. These other FEIS alternatives (alternatives B and C) looked at the regional issue of availability of harvestable resources by discussing:

- Where, within the NPR-A there are critical habitats essential to the preservation of harvestable resources:
- How oil and gas developments and activities might harm those habitats to the detriment of harvestable resources; and
- Which (how much) of those habitats should be deleted from the leasing program in order to assure that no measurable reduction in the abundance of harvestable resources would result from NPR-A leasing and development?

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The FEIS concluded that alternative A provided adequate site specific subsistence protections. Alternative C provided an adequate level of protection to harvestable subsistence resources. Since all of alternative A's protections were a lesser included part of alternative C, the State Director concluded that alternative C would adequately preserve subsistence resources and assure continuing opportunities and harvest those resources.

The authors of this evaluation are also cognizant that the Congress mandated oil and gas leasing within NPR-A and, therefore, alternatives that would not authorize leasing (for example, national energy conservation) are not available.

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APPENDIX ONE

ESTIMATING THE AMOUNT OF LAND WITHIN NPR-A DEVELOPED AREA(S)

Table Six lists prospects identified by BLM specialists as being economically recoverable that have been offered at previous NPR-A sales. These eleven prospects include several offered at the third sale. The average oil productivity per acre based on these eleven prospects is 8505 barrels. Dividing the 1.46 billion barrels of oil estimated for NPR-A by this 8505 barrels per acre yields a zone of field development estimated at 171,664 acres\* (about 70,000 hectares). Dividing this by 23,040 (the acres in one township size tract) yields an estimate of 7.45 (township sized) tracts in the developed zone. This is fully consistent with the Prudhoe Bay and Kuparuk experience (see Exhibit Two) where over 10.5 billion barrels will have been produced (over the life of the two fields) from "units" that encompass all or part of 29 township sized tracts.

It should be noted that ten of the twenty-nine township sized tracts within the Prudhoe and Kuparuk units have facilities within their perimeters while two tracts are proposed to receive facilities (Kuparuk second operations center and associated wells). Thus about 42 percent (12/29) of the Kuparuk/Prudhoe units shown on the attached map will have been subject to facility placement. Consistent with the FEIS preferred alternative, the BLM intends to employ mitigations that consolidate facilities to reduce the areal extent of disturbance. Assuming that the BLM does as well as, or improves on, the historic practice then facilities would be sited on 4 or fewer NPR-A (township sized) tracts (7.5 tracts within units times 42 percent of tracts having facilities). The 7.5 tracts within developed "units" would, at 23,040 acres per tract, equal about 3/4 of one percent of NPR-A's surface. The 4 tracts with facilities would equal about 4/10 of one percent of NPR-A's surface (4 tracts x 23,040 acres per tract divided by 23,000,000).

It should also be noted that the chance that any of the prospects in Table Six will be found to be commercially recoverable is only about one in five. Thus, the reader is properly cautioned against presuming that there are substantial reserves within NPR-A. The proper interpretation of Table Six is that there are a number of prospects that, if they contain oil in the amounts shown, would be major fields. However, the probability is very high (4 chances in 5) that none of these prospects will be found to contain recoverable oil.

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\*The Draft NPR-A EIS (U.S. Department of Interior, 1982) described pipelines rights-of-way as being 50 feet in width with an associated road of 30 feet in width (80 ft. total width). At a forecasted 199 miles of pipeline within the NPR-A, this equates to an additional area of disturbance of 1900 to 2000 acres.

TABLE SIX

## Analysis of Areal Extent of Fields

NPR-A Prospects	Acreage	Unrisked Resources (barrels of oil)	Unrisked Resources Per Acre (barrels/acre)	Probabilities	
				Likelihood that this outcome would occur	Likelihood that this outcome would not occur
A	47,301	580,628,304	12,275	.019	.981
B	40,103	643,001,856	16,034	.012	.988
C	108,409	1,206,521,760	11,129	.010	.990
D	68,920	397,771,360	5,771	.009	.991
E	45,816	529,114,176	11,549	.016	.984
F	22,733	183,850,368	8,087	.046	.954
G	22,820	105,408,000	4,619	.045	.955
H	34,460	238,955,360	6,934	.028	.972
I	22,996	261,539,504	11,373	.016	.984
J	160,121	900,000,000	5,621	.014	.986
K	68,973	419,000,000	6,075	.015	.985
Totals	642,682	5,465,790,688	8,505		

The joint probability of at least one commercial discovery being made from this set of prospects is .208  
 (1.0 minus .981 x .988 x .990 x .991 x .984 x .954 x .955 x .972 x .984 x .986 x .985)

APPENDIX TWO

An Assessment of the Wildlife Impact Implications  
of the South Barrow Field

### Wildlife Resources

The wildlife resources within the National Petroleum Reserve in Alaska (NPR-A) were analyzed in an EIS released in March 1983. In that EIS, stipulations were developed to protect NPR-A's wildlife resources during the leasing and exploration phases of oil and gas activities.

If, after exploration activities are commenced, a commercially recoverable oil field is identified, a new NEPA document (hereafter referred to as an environmental document, or ED) covering field development would have to be completed. In that ED, the stipulations from the March 1983 FEIS would be more precisely specified (refined) to assure the conservation of wildlife.

The development of a producing oil and gas field would adversely affect wildlife in two principal ways--first, habitat disturbance and second, species disturbance. The FEIS deals with these impacts by adopting a general "Habitat Preservation" stipulation (page 82) for general habitat(s) and a Special Management Zone (SMZ) stipulation for critical habitats (Figure Four in the May 1, 1983 Record of Decision). The following discussion of the effects of a hypothetical field near Barrow (see page 13 above) analyzes possible impacts in light of the FEIS stipulations and in view of refinements in wildlife conservation measures that would likely grow out of the ED.

#### 1. Habitat Effects.

The BLM, under the FEIS stipulations (Exhibit One), has reserved broad discretionary powers including the authority to require the relocation of facilities, to buffer these facilities from wildlife (by sensitive use of terrain or vegetation to screen facilities from view or hearing) and/or to apply seasonal restrictions on activities. Because of BLM's discretionary authority to relocate and/or consolidate facilities and activities, disturbance would occur in restricted areas (i.e., pads, roads) which occupy only a small share of the field area. Thus, although wetland areas will be occasionally lost for waterbird nesting, this should not have any major effect on the overall waterbird populations within the area. In addition, some areas used by wintering caribou will be lost; however, because of the small acreages involved, there should be very little negative effect on the overall winter range.



Habitat disturbance itself, because of the small surface acres that will be actually disturbed, should have a minimal impact on the wildlife resources within the area.

## 2. Species Disturbance.

The major effect of a developed field within the area could be species disturbance. The area of the hypothetical Barrow field has a high density of dabbling and diving ducks (10 per square mile--15 per square mile respectively). In addition, it supports medium densities of geese and whistling swans (3-7 per square mile -- .1-1 per square mile respectively). These waterbirds could be disturbed if construction activities were to be conducted during critical nesting and molting periods. However, FEIS and permitting stipulations from the new ED could protect the waterbirds during the critical nesting and molting periods. Examples of such stipulation include:

Major construction activities (i.e., roads, drill pads) would be authorized only from September 1 to May 15 of each year.

Hunting or movement of oil field workers off facility pads, roads, and other developed areas would be barred.

Fields would be designed (facilities would be sited) to avoid or minimize the occupancy of critical and prime habitats (no surface occupancy or limited surface occupancy)

Aircraft operations would be restricted to avoid disturbances during the nesting and molting season.

These permitting stipulations that were identified in the ED would help mitigate oil and gas impacts on the waterbird populations within the area.

This area within the hypothetical South Barrow field is also used by portions of the Western Arctic and Teshekpuk Caribou Herds as a wintering area. A developed field with roads, drill pads, pipelines, airstrips and material sites would have some adverse effects on the caribou migrating through or wintering within the area. However, stipulations identified in the ED would generally mitigate (minimize) the negative impacts of oil and gas development.

Examples of such mitigations include:

Pipelines could be elevated so that a greater clearance would be provided and there would be sufficient space for caribou to move beneath the pipe above any drifted snow.

Short sections of the pipeline would be buried (ramped) to help caribou movement through the area.

Knowledgeable design would be used to take advantage of topographic features which would enhance winter crossing success.

Vehicle traffic on roads would be controlled (i.e., convoys required, closure of the road to all traffic during seasonal migrations, etc.) to help enhance winter crossing of the area.

These and many other stipulations identified by the new ED as refinements of the FEIS "Habitat Protection" and SMZ stipulation would mitigate any reasonably foreseeable and significantly adverse impacts of oil and gas on the caribou and other wildlife resources of the area.

#### Conclusion

Before a major project such as developing an oil and gas field, the BLM through the NEPA process, would refine stipulations and mitigating measures to conserve the wildlife resources of the area.

Developing any major oil field within the Barrow area would have some negative impacts on the wildlife resources. However, if the stipulations and mitigating measures that were adopted in the May 1, 1983 Record of Decision are refined by the field development ED through the process discussed in this appendix then it is not felt that there will be any significant impacts to overall wildlife resources within this area.

APPENDIX THREE

Conceptual and Procedural Issues In  
Evaluating Subsistence Restrictions

## BACKGROUND

Prior to any ground-disturbing activities leading toward oil and gas development on any lease tracts within the National Petroleum Reserve-Alaska (NPR-A), the Bureau of Land Management (BLM) must issue a specific authorization permit. This is not an automatic formality. Under the National Environmental Policy Act of 1969 (NEPA, PL 91-190), the BLM is required to make various analyses of the possible effects of its actions. Additionally, the Alaska National Interest Lands conservation Act of 1980 (PL 96-487), mandates an evaluation of "subsistence uses and needs." Specifically, Section 810 of ANILCA requires:

SEC. 810 (a) In determining whether to withdraw, reserve, lease, or otherwise permit the use, occupancy, or disposition of public lands under any provision of law authorizing such actions, the head of the Federal agency having primary jurisdiction over such lands or his designee shall evaluate the effect of such use, occupancy, or disposition on subsistence uses and needs, the availability of other lands for the purposes sought to be achieved, and other alternatives which would reduce or eliminate the use, occupancy, or disposition of public lands needed for subsistence purposes.

The discussion that follows on the next several sections identifies (1) the "810 compliance" analyses done as part of the Final Environmental Impact Statement (FEIS) covering the 5-Year Leasing Program in the NPR-A; (2) the 810 compliance effort(s) scheduled to be done for each leased tract as part of the process of issuing specific authorization permits for specific proposed developments; and, (3) the subsistence impacts of a hypothetical field near Barrow.

## 810 COMPLIANCE FOR THE NPR-A LEASING PROGRAM EIS

During the EIS process, various sources of information were used to construct a "working document" showing what BLM understood to be areas of "high," "medium," and "low" value to subsistence users of the EIS. This document was included in the EIS by reference (page 44 of the Final EIS) and was sent out to persons on request. In effect, this document (a map and a page explaining it) was BLM's best approximation of the relative importance of various tracts for then-current subsistence use by North Slope residents based on the following sources:

- North Slope Borough's "Traditional Land Use Inventories" for Nuiqsut-Tasikpak (Aug. 1976 edition, Barrow-Atkasook (Nov. 1977 edition), Wainwright (Aug. 1976 edition), and Anaktuvuk Pass (Oct. 1977 edition).
- "North Slope Borough Comprehensive Plan," (Draft) July 1981 (especially "map 10").
- Locations of Native allotments.
- NPR-A 105(b) and 105(c) studies.
- "Regional Subsistence Land Use: North Slope Borough, Alaska" by S. Pedersen, Occasional Paper No. 21, Anthropology and Historic Preservation Cooperative Park Studies Unit, Univ. of Alaska, Fairbanks and Dept. of Conservation and Environmental Protection, North Slope Borough, Barrow, Alaska.
- Two maps of sites and resources prepared in 1974 and 1975 by the Arctic Slope Regional Corporation and the Arctic Environmental Information and Data Center, Univ. of Alaska.
- Certain interviews and geographical considerations.

Tracts received a rating of "high" value on the map whenever a Native Allotment or North Slope Borough "Traditional Land Use Inventory" (TLUI) site was located within the tract. Thus any indication of potential site-specific subsistence use anywhere within a tract was enough to trigger a "high" value for a tract on the subsistence rating map document.

A rating of "medium" relative value for subsistence use was given to selected tracts when BLM had no indication of site-specific subsistence activities going on within the tract but was aware of subsistence use of the tract. For such tracts, BLM's information was that the subsistence use was of a more generalized nature and non-site-specific--such as generalized hunting activities where subsistence users utilize an extended area.

A rating of "low" relative value for subsistence use was given to those tracts no less than 75 miles away from villages--thus beyond the reaches of most village-based subsistence users on foot or snowmachine. Low tracts also were those generally away from utilized waterbodies or their significant tributaries.

It is very important at this point to further emphasize that:

...this evaluation is preliminary and is subject to change as further tract-specific data are received from local residents of the NPR-A and from other sources. Such additional information is welcomed and could be useful in future lease tract selections and stipulations. The ratings of "high," "medium," and "low" for the various tracts reflect the best current information available. Yet this, and all such ratings, are potentially misleading unless the following important fact is realized: Subsistence use areas of the NPR-A change as resource patterns shift. A tract rated "low" today could indeed be of "high" value for subsistence uses in the future. Thus, in this sense, all tracts could be rated "high" for their future potential importance. Recognizing this dilemma, plus various data gaps, the evaluation given here must be recognized only as a "working document"--and not the "final statement" on these tracts.



By setting forth this note of caution, the authors acknowledge that there are data gaps in available records on where site-specific current subsistence uses were occurring, and that this map was only preliminary and subject to change as further tract-specific data were received in the future. Nonetheless, the rating system discussed above and the map developed to illustrate the rating system represent BLM's best indication of the relative values of certain possible lease tracts for subsistence uses.

Elsewhere in the Final EIS, the effects of oil and gas leasing on subsistence uses and needs were evaluated in general (pp. 115-120), including a village-by-village summary (p. 120).

#### 810 COMPLIANCE AFTER A LEASE SALE

Certain lease tracts in the 3rd NPR-A lease sale held July 20, 1983 received one or more of a total of 8 special lease stipulations which were based on similar stipulations developed for the 1st and 2nd NPR-A lease sales held in 1982.

For the 3rd NPR-A lease sale held July 20, 1983 there were three special stipulations which pertained most directly to subsistence uses: These are the "Wildlife Conservation," "Subsistence Lifestyle," and "Subsistence Fisheries" stipulations.

The Wildlife Conservation stipulation was assigned to lease tracts with specific known wildlife values to help in their conservation, which, in turn, will facilitate the continuance of the opportunity to pursue subsistence uses of NPR-A lands. This stipulation is notable in setting time periods within which activities authorized under an application for permit to drill (APD) must be restricted to conserve wildlife resources. Further, this stipulation looks at cumulative effects of activities on wildlife and gives BLM the explicit power to approve, deny, or modify the lessee's proposed operations after considering such cumulative effects. Input to assign this stipulation to specific tracts was based on various studies and documents, including BLM field observations and records.

The Subsistence Lifestyle stipulation was attached to all lease tracts which had a "high" value rating for subsistence uses on the map/document described earlier in this evaluation. As noted, those were the only tracts offered in the 3rd Lease Sale for which BLM had site-specific subsistence information, as based on the aforementioned map sources.

Those tracts in the 3rd NPR-A Lease Sale receiving the subsistence lifestyle stipulation were:

Subsistence Lifestyle--- Tracts 1, 6, 7, 9, 10, 11, 14, 16, 17, 19, 20, 21, 24, 25, 26, 28, 30, 32, 33, 35, 36, 41, 42, 45 through 50, 52 through 56, 71, 72, and 76)

This stipulation reads as follows:

Areas within this lease contain harvestable resources utilized by North Slope residents as part of their subsistence lifestyle. If subsistence impacts are determined to be potentially significant by the AO, the lessee, prior to any drilling, construction or placement of any exploration/development structures on lease areas, including pipeline and facility placement (hereafter referred to as "operation"), shall gather site-specific information using field examination techniques approved by the AO. On all areas where operations will take place, the field examination(s) shall identify the following:

- a. active subsistence hunting, fishing, trapping or gathering sites:

- b. relocating the site of such operations and the design of production, processing and transportation facilities to assure continued access of the subsistence user to the subsistence sites and to areas where the harvestable resources are of known high density; and/or
- c. establish that such operations will not have a significant adverse effect upon the harvestable resources, the subsistence sites, and/or the subsistence users' access to the sites or resources after consultation with those rural Alaskans who actively use the area for subsistence.

In sum, the thrust of the Subsistence Lifestyle stipulation was to assign to the lessee the responsibility of gathering site-specific information on subsistence uses occurring within the purchased lease tract. A report setting forth the lessee's methodology, study results and conclusions along with recommendations for mitigations must be provided to BLM. Based on this report and any other available information, the BLM would further evaluate the effects of proposed activities on subsistence uses and needs. Using the new information, within each tract it then would be possible to direct the positioning of development activities and facilities so as to lessen impacts to any ongoing subsistence uses and needs. Thus, for example, important trapping areas could be avoided by requiring no surface disturbance in the vicinity of a trap line (thus making directional drilling necessary for the oil developer).

Overall, the Subsistence Lifestyle stipulation, requiring a subsistence study, would provide the BLM with site-specific current data on subsistence uses. Such information would then enable BLM to design its authorization permit to mitigate the effects on subsistence uses and needs by oil and gas development.

Currently, BLM is finalizing guidelines for the preparation and required content of subsistence reports made to fulfill the Subsistence Lifestyle stipulation and other subsistence report requirements not involving the 3rd NPR-A Lease Sale.

For 3rd Lease Sale tracts which did not receive the Subsistence Lifestyle stipulation (being tracts without reported site-specific subsistence use), the BLM, itself, will do the required evaluation of subsistence uses and needs for 810 Compliance. This will include using the best available office data, plus contacts with the Alaska State Department of Fish and Game, North Slope residents and/or representatives, and other relevant sources of information. In addition, the BLM may require additional data on subsistence uses which could involve field studies.

The Subsistence Fisheries stipulation was developed in recognition of the importance of major North Slope rivers and streams. Following release of the Draft EIS in 1982 for the 5-Year Leasing Program in the NPR-A, local residents of the area surfaced concern over protection of their subsistence fishing. Accordingly, major "subsistence rivers" were identified by BLM for the preferred alternative in the Final EIS. The following special stipulation was devised and was attached to tracts wherein a "subsistence river" flowed. These are listed below:

Subsistence Fisheries--- Tracts 1, 9, 10, 14, 15, 16, 19, 21, 23 through 26, 28, 31, 38, 41, 42, 44 through 48, and 50 through 56

No activities will be authorized within 300 yards of aquatic habitat (i.e. streams and lakes or estuarine and marine habitats) which support a subsistence fishery. Limited exceptions may be specifically authorized in writing by the AO if the lessee can reasonably demonstrate to the satisfaction of the AO that such activities would not interfere with continued subsistence use.

The following data sources were used to determine which water bodies would be called "major subsistence rivers":

- Site-specific listings of fishing sites noted on the 4 North Slope Borough Traditional Land Use Inventories cited at the bottom of page 1 in this paper (all portions of all rivers downstream from any TLUI fishing site were included in the major "subsistence river" classification)

- Data on rivers used for fishing from the North Slope Borough, Environmental Protection Office Wildlife Biologist, John George, on 12/3/82
- Identification of Native Allotments along rivers
- Draft copy of an oral history report commissioned by the North Slope Borough, entitled: Chipp-Ikpikpuk River and Upper Meade River Oral History Report, by Dr. William Schneider, Program for the Preservation of Oral History and Traditions, University of Alaska-Fairbanks, and Dr. Wendy H. Arundale, Anthropology Department, University of Alaska-Fairbanks (a copy of their report could be obtained from the authors and/or North Slope Borough)
- - The NPR-A 105-b and 105-c studies, plus background information on the Kuk River
- Data on rivers used for fishing obtained during the North Slope Borough Fish and Game Committee meeting held 12/15/82 in Fairbanks (see copy of the map attached which summarizes information supplied by Arnold Brower, Jr., Chairman of the Western Arctic Fish and Game Local Advisory Committee -- this map also identifies the various major "subsistence rivers")

#### CONSIDERATION OF "SIGNIFICANT RESTRICTION" OF SUBSISTENCE USES OF 3RD NPR-A LEASE SALE TRACTS

Section 810 of ANILCA states that after an evaluation of subsistence uses and needs takes place, then the issue of "significant restriction" to subsistence uses must be considered. However, no definition or guidelines on what constitutes a "significant restriction" were given. To this point, BLM's approach has been that to have a "significant restriction" to subsistence uses, an impact would have to be in a significant subsistence area. Yet, since such significant areas would be identified during the site-specific subsistence analysis under terms of the Subsistence Lifestyle special stipulation or by BLM's own evaluation, mitigation could be incorporated into the permit(s) authorizing the development. Thus, "significant restriction(s)" should be avoidable or at least lessened in many cases with impacts affecting individuals more than entire villages.

During the analysis for the EIS for oil and gas leasing within the NPR-A, BLM surfaced no evidence to conclude that the leasing program, itself, and the resulting exploratory drilling it implied as a consequence would "significantly restrict" subsistence uses. It was concluded that site-specific impacts, if any, could be mitigated by usual BLM stipulations plus the special stipulations noted on pages 43-45 above. Further, as also mentioned earlier, the deletions and deferrals adopted as part of the preferred alternative were additionally designed to mitigate potential impacts to subsistence uses--particularly the more generalized, area-wide impacts to certain wildlife species.

Section 810 of ANILCA has the following to say about "significant restriction of subsistence uses" and what specific requirements BLM must meet whenever an evaluation would conclude that such significant restriction would occur (which was not the conclusion of the NPR-A Leasing EIS):

No... withdrawal, reservation, lease, permit, or other use, occupancy or disposition... which would significantly restrict subsistence uses shall be effected until the head of such Federal agency--

1. gives notice to the appropriate State agency and the appropriate local committees and regional councils established pursuant to section 805:
2. gives notice of, and holds, a hearing in the vicinity of the area involved: and
3. determines that (A) such a significant restriction of subsistence uses is necessary, consistent with sound management principles for the utilization of the public lands, (B) the proposed activity will involve the minimal amount of public lands necessary to accomplish the purposes of such use, occupancy, or other disposition, and (C) reasonable steps will be taken to minimize adverse impacts upon subsistence uses and resources resulting from such actions.

If exploratory drilling resulting from the 3rd NPR-A Lease Sale were to discover oil and gas reserves justifying production, then another NEPA document would be written to analyze production-related developments before they could be authorized by BLM permits. This would mean that new 810 compliance would occur, including probable new site-specific research on subsistence uses and needs. Further, consideration of possible "significant restriction" to subsistence uses would begin again and would examine such production-related developments as roads, pipelines, etc.

To illustrate the field development ANILCA compliance (that is, to simulate the results of that 810 compliance/NEPA document preparation process), the discussion below analyzes compliance actions taken to bring a prototypical field south of Barrow into conformance with the intent of Section 810.



The NEPA document mentioned in the preceding discussion would gather both area-wide and site-specific data on subsistence uses involving the affected tracts. Further, additional site-specific analysis of impacts to subsistence uses would have taken place before the permitting of individual placements of development-related facilities. Thus, to lay out the hypothetical development example implies that very detailed site-specific analysis of subsistence uses has already happened--and that mitigation has already occurred.

On page 13 a discussion appeared regarding the existence of a map showing the location and facility placement for the hypothetical field. To document the possible impacts to site-specific subsistence use sites within this field, the 19 TLUI sites and Native Allotments shown as within the hypothetical example development south of Barrow were analyzed as to the type of use taking place on these sites. The significance of these sites and a description of uses occurring on those sites as copied off the North Slope Borough Traditional Land Use Inventory for the Barrow-Atkasook area (Nov. 1977 edition) is presented on the pages that follow. These pages present a summary of: 1) the respective significance of each site; 2) possible impacts such sites might receive for their subsistence uses from the hypothetical example development; and 3) possible mitigation to lessen or eliminate such impacts.

<u>Type of Use:</u>	<u>Site # from TLUI:</u>	<u>Possible Impacts &amp; Mitigation:</u>
1 = Cabins/Shelter Cabins Today	#35	Disturbance and unauthorized use could be mitigated by siting development away from the cabins and stipulating no disturbance
2 = Graves/Cemetery	None reported	----(Note: if unreported graves were found during required archeological surveys, mitigation by avoidance might be stipulated)
3 = Ruins/Sod House/ Bones	#13, 14, 18, 19, 35, 36	Disturbance and/or unauthorized use could be mitigated by siting developments away from such areas which might receive additional protection from Federal laws addressing archeological sites
4 = Fishing Area	#26B, 28, 29, 34, 35, 36, 76, 134	Destruction of fish and fish habitat would be mitigated by stipulations and laws governing setbacks of facilities from streams and discharges into water bodies, plus tight regulation of gravel and water extraction (if allowed at all)
5 = Trapping Area	#14, 19, 26B, 28, 29 34, 35, 36, 112, 113, 114, 131, 134	Wildlife and/or trapline disruption could be mitigated by siting development facilities away from specific trapping area and trap line identified in a subsistence study
6 = Hunting/Camping Area	#13, 14, 15, 16, 17, 18 19, 26B, 28, 29, 34, 35, 36, 76, 112, 113, 114, 131, 134	<u>Hunting:</u> see Appendix Four for a discussion of possible impacts to wildlife  <u>Camping:</u> destruction or disturbance of important camping area could be mitigated by siting development away from such areas and stipulating no disturbance

<u>Type of Use:</u>	<u>Site # from TLUI:</u>	<u>Possible Impacts &amp; Mitigation:</u>
7 = Cellars	#14, 18, 28, 29, 34, 35	Disturbance, destruction, or unauthorized use could be mitigated by siting developments away from such areas which might receive additional protection from Federal laws addressing archeological sites
8 = Other (nesting, seals, roots)	#14, 17, 19, 26B, 76	<p><u>Nesting:</u> see Appendix Four</p> <p><u>Seals:</u> destruction or disturbance of important sealing camps could be mitigated by siting development away from such areas and stipulating no disturbance; under the Marine Mammal Protection Act, non-Natives are barred from harvesting seals, thus no additional harvest pressures should occur</p> <p><u>Roots:</u> destruction or disturbance of important sites for collecting roots, <u>berries</u>, or other plants could be mitigated by siting development away from such areas and stipulating no disturbance</p>
9 = Whaling Settlements, Area	#14	Disturbance, destruction, or unauthorized use could be mitigated by siting developments away from such areas
10 = Important Events, Old Site	#14, 18, 35, 36	Disturbance and/or unauthorized use could be mitigated by siting developments away from such areas which might receive additional protection from Federal laws addressing archeological sites
11 = Reindeer Herding Sites	#19, 35	Disturbance, destruction, or unauthorized use could be mitigated by siting developments away from such areas

Data on the location and "type of use" of the Native allotments are primarily drawn from BLM field examinations conducted principally in 1982 and 1983. Each allotment will be surveyed at a future date and minor adjustments could be made to boundaries at that time. Once surveys are complete, title to the surface estate will pass to individual Natives. Protection of any subsistence values would then be subject to negotiations between the Native surface owner, the Bureau of Indian Affairs (as advisor to the Native surface owner) and the lessee or permittee. Native surface owners might elect to negotiate occupancy fees, to restrict occupancy and/or to require rehabilitation of disturbed areas before granting permission to site certain development-related facilities or structures (e.g. wells, pipelines, roads, etc.) on particular allotments. Without such permission, no surface disturbance by oil development could occur. The BIA would likely demand protection of site-specific subsistence uses and needs during these negotiations because BIA is also subject to ANILCA.

Finally, it is important to note that the ability to mitigate impacts to subsistence uses is further strengthened by Section 811 of ANILCA, which states:

(a) The Secretary shall ensure that rural residents engaged in subsistence uses shall have reasonable access to subsistence resources on the public lands.

(b) Notwithstanding any other provision of this Act or other law, the Secretary shall permit on the public lands appropriate use for subsistence purposes of snowmobiles, motorboats, and other means of surface transportation traditionally employed for such purposes by local residents, subject to reasonable regulation.

Based on BLM's ability to require site-specific subsistence use data before any ground-disturbing activity can occur, plus various laws and mitigation strategies available as outlined, the BLM has concluded that there will be no significant restriction to subsistence uses as a result of oil and gas leasing and subsequent exploratory drilling anywhere within the NPR-A. This conclusion includes all areas within the 3rd NPR-A Lease Sale held on July 20, 1983, plus all other areas identified in the Record of Decision as appropriate to lease for later NPR-A oil and gas lease sales.

The analysis of the hypothetical oil development area south of Barrow also indicates that no significant restriction to subsistence uses would occur even in a full development field.

### SELECTED REFERENCES

(Available from the Arctic/Kobuk Resource Area of the Fairbanks District Office)

1. Definition of the term "subsistence uses" from Section 803 of ANILCA.
2. Subsistence map described on pages 51-53, having been referenced in the Final EIS for NPR-A Leasing on page 44.
3. "Certain interviews and geographical considerations" used in devising the above-noted subsistence map.
4. Pages 115-120 from the Final EIS for NPR-A Leasing which discuss the effects of oil and gas leasing on subsistence uses and needs in general.
5. Copy of Draft Guidelines for the Preparation of Subsistence Reports (written during summer 1983 by Robert E. King).
6. Copy of notes made by Robert E. King from a meeting with John Craig George, Wildlife Biologist with the North Slope Borough Environmental Protection Office. The meeting occurred on 12/3/82 in Barrow, Alaska.
7. Map showing major "subsistence rivers" including data on rivers used for fishing obtained during the North Slope Borough Fish and Game Committee meeting held 12/15/82 in Fairbanks.
8. 2-page explanation of the hypothetical example (the illustrative map) for an oil development field south of Barrow involving tracts from the 3rd NPR-A Lease Sale (see pages 13-14 above).
9. 3-page paper entitled "Wildlife Resources" addressing possible impacts to wildlife (including caribou and waterbirds) and possible mitigation (see Appendix Four, page 45).
10. Information from the North Slope Borough Traditional Land Use Inventory for the Barrow-Atkasook area (Nov. 1977 edition) on the 19 TLUI sites mentioned in the hypothetical example of an oil development field south of Barrow.

Appendix Four

Caribou Demographics and Industrial Development(s)

The Central Arctic Herd has experienced industrial development(s) within its range. The BLM is aware that this has led to avoidance responses by the herd and other behavioral impacts. (Alaska Biological Research, 1982. Cameron, Raymond D. 1982). There is, at present, no evidence (See Table Seven) that these adverse behavioral effects lead to demographic impacts (decreasing populations).

Table Seven

Population Estimates for Arctic Caribou Herds

Survey

<u>Years</u>	<u>Western</u> <u>Arctic</u> <u>Herd</u>	<u>Central</u> <u>Arctic</u> <u>Herd</u>	<u>Teshekpuk</u> <u>Lake</u> <u>Herd</u>	<u>Porcupine</u> <u>Herd</u>
1977	90,000	**		**
1979	113,000	**		110,000
1980	140,000	**		**
1981	**	8,500	3000-4000***	**
1982	171,000	10,000		138,000
1983	**	11,000		**
Average Growth	+14%	+14%		+8%

\* Source: Personal Communication (telephone discussion), Patrick Valkenburg, Alaska Department of Fish and Game, Caribou Researcher. October 5, 1983.

\*\* Data either not furnished or still being finalized

\*\*\* The Teshekpuk herd is, according to Valkenburg, lightly studied and there are no known population estimates other than the 1981 figure.



APPENDIX FIVE

Competition For Big Game

The Draft NPR-A Leasing EIS (U.S. Department of the Interior, 1982) predicted that increased recreation use (DEIS, p. 96) would result from improved access (oil field roads) to the NPR-A. Commenting on this quantitative analysis SOHIO Alaska Petroleum Company (1982) pointed out that BLM's DEIS had in fact estimated the number of recreationists likely to depart from Fairbanks in response to the (perceived) improved access. SOHIO correctly asserted that many of these recreationists would, because of intervening opportunities of high recreational value, not arrive in the NPR-A. Specifically, SOHIO stated:

Data provided do not support the assumption that 335 canoeists and kayakers would utilize the NPR-A rivers if roads were opened into the area. What the data do support is a supposition that 335 canoeists and kyakers would range farther from Fairbanks if roads were available. The data support the supposition that utilization of rivers and streams accessible along the Dalton Highway would increase, however, the data do not identify recreationists that are willing to travel one day or more to reach rivers and lakes within the NPR-A. Without data to support the assumption that all 335 boaters are willing to travel at least eight hours to reach recreational sites, the predicted impact should be reduced to perhaps, 35 (10% of those willing to travel one hour or more). Assuming parties of two, the impacts on the Colville River could be assumed to be .2 parties per day or one party every five days, which is a significantly different impact than that predicted in the DEIS.

A similar assumption may be made with regard to caribou hunting, although the factor might be somewhat larger (perhaps 25%), resulting in perhaps 100 additional hunters, provided hunting licenses were available.

The BLM concurs with SOHIO that 100 additional "sport" hunters in NPR-A is a more defensible estimate of the effects of improved access.

These 100 hunters, at an average of 2 caribou harvested per hunter\*, would have a negligible effect on the Arctic population(s) of this big game and subsistence resource (200 caribou out of an estimated population of 300,000). Thus BLM as part of this evaluation, has reached a Finding of No Significant Impact (FONSI) relative to the issue of possible sportsmen/subsistence harvester competition.

\*Because there are no data on how many caribou these "new" NPR-A hunters would take the Kodiak Island deer hunt was used to estimate the average harvest rate (caribou/hunter). Kodiak Island, with a bag limit of 5 deer, was considered to provide the best analogy with Arctic caribou hunting (with no current upper limit on how many caribou can be lawfully harvested). Although the hunters visiting Kodiak Island could, under past bag limits, take five deer each, these sportsmen have averaged only 2 deer per hunter (State of Alaska. 1981).

APPENDIX SIX

REASONABLY FORSEEABLE OUTCOMES

For purposes of this analysis, the NPR-A has been divided into four zones. These are:

- 1) Zone ISUA (Intensive Subsistence Use Areas) includes the lands intensively used for subsistence activities (lands within 30 miles of the coast and/or more than 30 miles from the coast but within 50 miles of a village);
- 2) Zone 82 SA (1982 sale areas) contains lands offered at the two (1982) NPR-A sales;
- 3) Zone DEL covers the lands deleted from the five year program; and
- 4) Zone RRA (Remaining Reserve Lands) holds the remaining NPR-A lands.

Based on past assessments of NPR-A's oil potential, Table Eight identifies the possible outcomes resulting from leasing lands in those four zones. This "potential-assessment-process" was accomplished through the use of a computer assisted "model" (U.S. Department of Interior, Office of Minerals Policy and Research Analysis. The unpublished computer printouts may be viewed by contacting the Deputy State Director for Mineral Resources, BLM Alaska State Office). Key estimates from this modeling effort are:

- There are an estimated 54 prospects (subsurficial features capable of trapping hydrocarbons) in NPR-A;
- 33 of these prospects are estimated to contain hydrocarbons;
- Many of these "prospects-with-hydrocarbons" would not be "large enough" to justify the substantial investment needed to bring them into production;
- The "screening" process (where industry, based on geophysical data, juries which prospects are "large enough" and decides whether or not to drill) would lead to between ten and twenty of these prospects being drilled and to 3 of these "drilled" prospects being produced.

Based on these key estimates and based on production of 8505 barrels per acre and 58,426 acres in the average prospect, the estimated potential of NPR-A's three "produced" prospects is 1,491,000,000 (one billion, 491 million barrels). The probabilities shown in Table Eight are BLM's estimates of the likelihood that these 1,491 billion barrels will be discovered and produced under the various outcomes.

Table Eight  
Outcomes/Probabilities Assessment

<u>Outcomes Ranked</u>	<u>"Possible"</u>	<u>Estimated</u>
<u>By Relative</u>	<u>Outcomes</u>	<u>Probabilities</u>
<u>Likelihood</u>	<u>Described*</u>	<u>of the Outcomes</u>
1 (most likely)	Discovery and production (D&P) from Zone 82SA only	.287
2	D&P From Zone RRA only	.209
3	No discoveries anywhere in NPR-A	.170
4	D&P on Zone ISUA only	.132
5	D&P on Zones 82SA and RRA	.076
6	D&P on Zones ISUA and 82SA	.049
7	D&P on Zones ISUA and RRA	.036
8 (Median likelihood)	D&P on Zone DEL only	.016
9	D&P on Zones ISUA, 82SA and DEL	.013
11	D&P on Zones DEL and RRA	.0033
12	D&P on Zones ISUA and DEL	.0021
13	D&P on Zones 82SA, DEL and RRA	.0016
14	D&P on Zones ISUA, 82SAA and DEL	.0003
15 (Least likely)	D&P on All Zones	.0001

\* Outcomes involving Zones DEL (deleted critical habitats) lands are only theoretically possible because these critical habitats may never be offered (but still have some probability that development would have taken place had they been offered).

In terms of "reasonably foreseeable outcomes", development(s) on lands intensively used for subsistence are:

- Among the more likely as one outcome (D&P on Zone ISUA alone) is the fourth most likely event in Table Eight and three of the seven outcomes that are above the median involve development in Zone ISUA; and
- Necessary because deleting Zone ISUA would have resulted in a substantial reduction in the likelihood that the 1.491\* billion barrels of target hydrocarbons would be discovered and produced.

By way of comparison, the deletion of the "critical" caribou calving and black brant molting habitats had little effect on the likelihood that the 1.491 billion barrels would be found and produced as outcomes that include Zone DEL fall at or below the median likelihood.

This comparison of outcomes involving lands intensively used for subsistence (Zone ISUA) with outcomes involving lands deleted from the leasing program (Zone DEL lands) sheds light on the State Director's trade off analysis. Deleting the high value subsistence lands (Zone ISUA) would have been contrary to the public purpose (an expeditious program of leasing) while deleting the critical habitats (Zone DEL lands) has negligible implications for the public purpose.

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\*The authors of this Evaluation recognize that the FEIS contained an estimate of 1.46 billion barrels rather than the 1.491 billion barrels listed in this Appendix. The discrepancy between the predictions, while illustrating the fact that forecasting is not an exact science, has no substantial implications for this Evaluation.